

## PATENT ABSTRACTS OF JAPAN

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### (54) DETERGENT

#### (57)Abstract:

PURPOSE: To obtain a detergent having biodegradability and excellent washing effect on a wide range of materials and stains, comprising a polysaccharide composed of &beta;-1,3-glucan produced by a bacterium belonging to the genus Aureobasidium as a main chain.

CONSTITUTION: Aureobasidium sp. K-1 (FERM P-12,989), a bacterium belonging to the genus Aureobasidium, is subjected to shaking culture in a medium containing sucrose, sodium nitrate, potassium phosphate, potassium chloride, magnesium sulfate heptahydrate, iron sulfate heptahydrate, etc., at 27°C for 48 hours to give seed bacteria. Then the seed bacteria are cultured by a jar fermenter at 27°C for 96 hours while aeration. Then the cell is removed by filtration, the filtrate is mixed with isopropyl alcohol, precipitated polysaccharide fibers are recovered to give the objective detergent comprising a polysaccharide composed of &beta;-1,3-glucan as a main chain, having biodegradability and excellent washing effect on a wide range of materials and stains.

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CLAIMS

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[Claim(s)]

[Claim 1] The cleaning agent which consists of beta-1 produced by the microorganism belonging to the genus Aureobasidium, and a polysaccharide which makes 3-glucan a principal chain.

[Claim 2] beta-1 to which the aforementioned polysaccharide has branching of beta-1 and the glucose combined six times in the glucose of a principal chain, the cleaning agent according to claim 1 which consists of a 3-glucan.

[Claim 3] The cleaning agent according to claim 1 or 2 with which the aforementioned polysaccharide consists of three beta-1 per four glucoses of a principal chain, beta-1 with branching of the glucose combined six times, and a 3-glucan.

[Claim 4] beta-1 which the aforementioned polysaccharide has branching of three beta-1 per four glucoses of a principal chain, and the glucose combined six times, and has a sulfur content machine, the cleaning agent according to claim 1, 2, or 3 which consists of a 3-glucan.

[Claim 5] The cleaning agent according to claim 1, 2, 3, or 4 characterized by furthermore adding a surfactant.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention has biodegradability and relates to the large cleaning agent of the application range.

[0002]

[Description of the Prior Art] In recent years, the natural system cleaning agent of biodegradability is called for from the consideration to environmental pollution.

[0003] As an example of such a cleaning agent, it is xantho MONASU. Competition strike squirrel (*Xanthomonas compestris*) NRRLB-1459 The cleaning agent which consists of xanthan gum which is the polysaccharide to produce is known. The covering remover constituent of the front face which becomes JP,63-317567,A from xanthan gum, the sheathing washing constituent of the railroad vehicle which becomes the European Patent application public presentation No. 241779 specification from xanthan gum, JP,62-253696,A. The cleaning agent constituent containing perfume and the U.S. patent 4652393rd which become the acid fake plasticizer constituent and the European Patent application public presentation No. 174689 specification which become a number official report from xanthan gum from xanthan gum The cleaning agent which becomes JP,59-138300,A from xanthan gum at the remover row of coating which becomes a number specification from xanthan gum is indicated.

[0004] However, in the natural system cleaning agent of the conventional biodegradability, since a cleaning effect was not satisfactory compared with synthetic compounds, when the combined use with a lot of synthetic compounds was obliged practically, there was a fault, like stimulative is high and it used together with a surfactant, there was a fault that the builder effects were insufficient.

[0005] In view of this actual condition, having sufficient detergency, it is low stimulative and this invention aims at obtaining the large cleaning agent of the application range of biodegradability.

[0006]

[Means for Solving the Problem] this invention relates to the cleaning agent which consists of beta-1 produced by the microorganism belonging to the genus *Aureobasidium*, and a polysaccharide which makes 3-glucan a principal chain.

[0007]

[Example] This invention persons are aureobasidia (*Aureobasidium*) as a result of wholeheartedly research that the aforementioned technical problem should be solved. It found out having the detergency excellent in beta-1 produced by the microorganism belonging to a group, and the polysaccharide which makes 3-glucan a principal chain, and this invention was completed.

[0008] The cleaning agent of this invention is a cleaning agent which consists of beta-1 produced by the microorganism belonging to the genus *Aureobasidium*, and a polysaccharide which makes 3-glucan a principal chain.

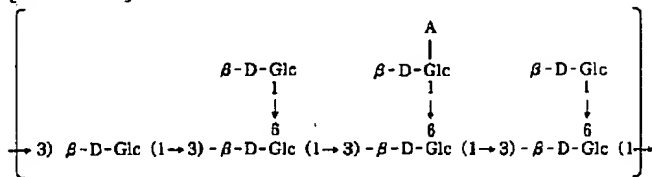
[0009] As a microorganism belonging to the genus *Aureobasidium* in the above, it is a trust number to a microorganism Agency of Industrial Science and Technology lab. Fine \*\*\*\*\* 12989 *Aureobasidium* deposited in the number (FERM P-12989) sp.K-1 is raised.

[0010] The polysaccharide which makes beta-1 and 3-glucan a principal chain is produced by the microorganism belonging to the genus *Aureobasidium* like the above. Although it will not be limited especially if it is, it is branching beta-1 and 3-glucan which consist of a structural unit mainly shown with a chemical formula (I), and a structural unit shown by the general formula (II), and have branching of beta-1 and the glucose combined six times in the glucose of a principal chain (the sum total of the number of structural units of the both sides in 1 molecule is about 1000-2000), and have a sulfur content machine. In more detail, three per four glucoses of a principal chain have branching of beta-1 and the glucose combined six times, and beta-1 and 3-glucan whose sulfur content is 0.1 - 1 % of the weight to a polysaccharide are main. The sulfur content machine in this invention shows a sulfo acetic-acid machine, a sulfonic group, a polysulfone acid radical, a cysteine, a cystine, or a methionine.

[0011] It sets to the analysis method of chemical and the physical property of this polysaccharide, and structure, and is science, industry 64 (3), and 131-135 (1990). And AGURIKARUCHURARU Biological It is as being stated to chemistry (Agric.Biol.Chem.) and 47(6)1167-1172 (1983) in detail.

[0012] Chemical formula (I) : [0013]

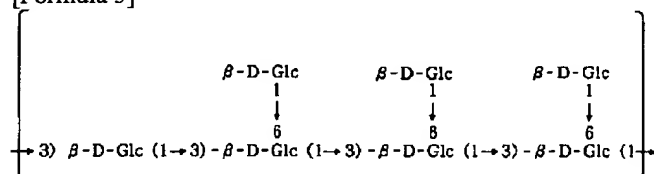
[Formula 1]



medium (sucrose 3% and sodium-nitrate 0.2 %, potassium phosphate 0.1 %, 0.05% of potassium chloride, 0.05% of magnesium sulfate and 7 hydrates, iron-sulfate and 7 hydrate 0.001 %) is made into a seed fungus, and it is a jar fermenter. 27 degrees C, number of churning 300rpm, the quantity of airflow of 50l. / min It cultivated for 96 hours. Subsequently, filtration removed the biomass from cultivation end liquid. It is 1.2 to the obtained filtrate. It added gradually, agitating the isopropyl alcohol of the amount of twice volume violently. The polysaccharide fiber which has deposited was collected, and in the acetone tub, being immersed and after washing and dehydrating, it dried at 70 degrees C. This fiber was ground and powder-sized with the feather shoe, and the polysaccharide was obtained. The structural unit and chemical formula (III) which are expressed with a chemical formula (I) when this polysaccharide is analyzed by the conventional method (science, industry, 64(3)131 -135 (1990), AGURIKARUCHURARU, and biological chemistry 47(6) 1167 - 1172 (1983) reference) The structural unit expressed showed the bird clapper. The sulfur content was 0.05 % of the weight to the whole polysaccharide, and the sum total of the number of structural units of the both sides in 1 molecule was about 1500.

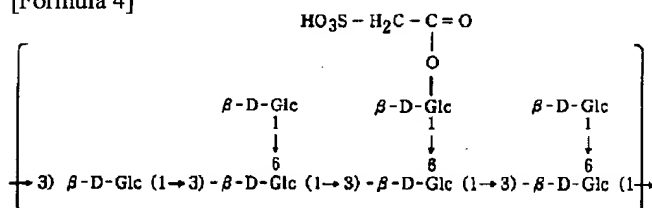
[0026] Chemical formula (I) ∴ [0027]

[Formula 3]



[0028] : Chemical formula (III) [0029]

[Formula 4]



[0030] [-- Glc expresses a glucose among a formula]

JIS K3362-1990 According to the method, the cleaning effect to each test piece was examined using the dirt bath and use water of composition which are shown below.

[0031] (Dirt bath)

Beef tallow 10g soybean oil 10g monochrome olein 0.25g oil red 0.1 g chloroform 60ml (use water)

Calcium chloride (two monohydrates) 59mg magnesium chloride (six monohydrates) 27.2mg distilled water 1l. (test piece)

Glass, copper, true \*\*, aluminum, or an iron board (76mmx26mm)

(Test method) First, the test piece was soaked in the dirt bath and it was left at the room temperature for 2 hours. 700ml of 0.05% solution of the polysaccharide obtained above as a penetrant remover next It used, the test piece was soaked in this, and it washed under churning for 3 minutes at 25 degrees C. Subsequently, the test piece was taken out and it was air-dry at 1 evening room temperature after washing under churning for 1 minute with the use water of a penetrant remover and the amount of said.

[0032] Thus, it is 560nm with a spectrophotometer after elution and about this solution at chloroform 40ml about the dirt of the front face of the washed test piece. The absorbance which can be set was measured. A result is shown in Table 1. The elimination factor was calculated by the following formulas.

[0033] <Dirt elimination factor>. [0034]

[Equation 1]

$$\left( 1 - \frac{B}{A} \right) \times 100 = \text{汚れ除去率 (\%)}$$

[0035] A: It is chloroform 40ml about the dirt which adhered on the test piece after a dirt air-drying process. 560nm of the eluted solution The absorbance B which can be set: 560nm of the solution eluted by chloroform 40ml in the dirt which adhered on the test piece after washing and a rinsing process They are 0.05 % of the weight and an index detergent (composition is shown below) about the polysaccharide same as absorbance example 2 penetrant remover as an example 1 which can be set 0.2 The solution weight % Included was used, and also it examined like the example 1. A result is shown in Table 1.

[0036]

(Index detergent)

Straight chain alkyl benzene sodium sulfonate 15 weight sections Ethanol 5 weight sections Urea 5 weight sections Distilled water The following surfactant was used instead of 75 weight sections examples 3 - 5 straight-chain alkyl benzene sodium sulfonate, and also make it be the same as that of an example 2. It examined.

[0037] A result is collectively shown in Table 1.

[0038] Example 3 Quarternary-ammonium-salt example 4 Polyoxyethylene-alkyl-ether example 5 It considered as the content

which shows six to amine oxide example 9 polysaccharide in Table 2, and glass was used as a test piece, and also it examined like the example 2.

[0039] A result is collectively shown in Table 2.

[0040] It is 0.2 as example of comparison 1 penetrant remover. Weight % index detergent solution was used, and also it examined like the example 1. A result is shown in Table 1.

[0041] Xanthan gum (Tradename KELZAN, Sansho [ Co., Ltd. ] Co., Ltd. make) solution was used 0.05% of the weight as example of comparison 2 penetrant remover, and also it examined like the example 1. A result is shown in Table 1.

[0042] They are 0.05 % of the weight and an index detergent as example of comparison 3 penetrant remover about xanthan gum (it is the same as what was used in the example 2 of comparison) 0.2. The solution weight % Included was used, and also it examined like the example 1. A result is shown in Table 1.

[0043] In four to example of comparison 6 examples 3-5, a polysaccharide was not used as a penetrant remover, and also it examined like examples 3-5. A result is collectively shown in Table 1.

[0044]

[Table 1]

表 1

	除去率 (%)				
	銅	真鍮	アルミ	鉄	ガラス
実施例 1	24.2	35.1	10.0	14.0	20.5
2	67.5	79.9	65.7	73.2	92.7
3	70.3	76.2	72.4	62.1	80.2
4	90.8	95.7	92.3	76.9	90.0
5	61.7	64.0	82.0	70.0	87.3
比較例 1	14.4	30.5	0.2	0	15.9
2	20.6	23.1	0	2.9	15.2
3	18.1	34.8	0	0	18.7
4	12.5	23.8	0.2	0	14.8
5	14.7	32.5	15	2.5	16.3
6	10.2	15.8	0	0	8.4

[0045]

[Table 2]

表 2

	多糖の含有量 (%)	除去率 (%)
実施例 6	0.2	91
7	0.5	92.5
8	0.8	93
9	1.0	92.5

[0046] Table 1 and 2 shows that the cleaning agent of this invention shows the cleaning effect which was excellent to various materials. Moreover, since there are few amounts of surfactants of synthetic compounds although a high dirt elimination factor is maintained and they live in it when this polysaccharide is independently used as a cleaning agent and it uses together with a

surfactant of course, since it is a natural product, the polysaccharide to contain can raise biodegradability as the whole cleaning agent.

[0047]

[Effect of the Invention] It is the cleaning agent which consists of a natural component which has biodegradability by this invention, and the cleaning agent which has the cleaning effect which was excellent to the material and dirt of the large range is obtained.

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[Translation done.]